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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,582	12/27/2001	John R. Rose	SUN1P847/P7054	9164
22434	7590	03/22/2005	EXAMINER	
BEYER WEAVER & THOMAS LLP P.O. BOX 70250 OAKLAND, CA 94612-0250			LAO, SUE X	
			ART UNIT	PAPER NUMBER
			2194	
DATE MAILED: 03/22/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/033,582

Applicant(s)

ROSE ET AL.

Examiner

Sue Lao

Art Unit

2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

### DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-36 are presented for examination.

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 1-36 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The language of independent claims 1-32 raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a useful, concrete and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101.

Independent claims 1, 21, 23 and 33 do not appear to require any computer hardware to implement the claimed invention. These claims appear to define the metes and bounds of an invention comprised of software alone. There is no support (i.e., explicitly claimed computer hardware) in the body of the claims. The "system" of the preamble of claim 23 appears to be a system comprised entirely of software. Software alone, without a machine, is incapable of transforming any physical subject matter by chemical, electrical, or mechanical acts. If the "acts" of a claimed process manipulate

Art Unit: 2194

only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. In re Schrader, 22 F.3d 290 at 294-95, 30 USPQ2d 1455 at 1458-59 (Fed. Cir. 1994). Transformation of data by a machine constitutes statutory subject matter if the claimed invention as a whole accomplishes a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d 1368, 1373, 47 USPQ2d 1596 at 1600-02 (Fed. Cir. 1998). MPEP 2106. State Street required transformation of data by a machine before it applied the "useful, concrete, and tangible test." However, State Street does not hold that a "useful, concrete and tangible result" alone, without a machine, is sufficient for statutory subject matter. State Street, 149 F.3d at 1373, 47 USPQ2d at 1601.

Claims 1-36 are rejected under 35 U.S.C. 101 because the claimed invention, appearing to be comprised of software alone without claiming associated computer hardware required for execution, is not supported by either a specific and substantial asserted utility (i.e., transformation of data) or a well established utility (i.e., a practical application).

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-36 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-36 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are computer hardware necessary to execute the claimed software and render the invention operative.

6. Claims 12-14, 23-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12-14 recite "the special object type" in line 2. There is insufficient antecedent basis for this limitation in each of the claims.

Claim 14 recites "the object type search" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

Claim 23 recites "the requested supertype" in line 6. There is insufficient antecedent basis for this limitation in the claim. For the purpose of art rejection, it is interpreted as "a requested supertype", as best understood and as it appears to be.

Claim 28 recites "The system recited in claim 23, ... the third group" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. For the purpose of art rejection, it is interpreted as "The system recited in claim 23, ... a third group", as best understood and as it appears to be.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 21, 23, 25-31, 33, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (U S Pub. No. 2003/0061230).

As to claim 21, Li teaches in an object oriented computing environment ([0001], [0002]), an apparatus for sub-typing an object ([0002]), comprising:

(k) means for receiving (fig. 4) an input object (source object, [0026]) having an object type (query type, [0022]);

(l) means for searching, wherein an embedded array (sub-root log storing successive supertypes (type hierarchy references, [0010]) and a cache (cache subset of entire type hierarchy, [0018]) are searched (compare, fig. 4) for an object sub-typing data structure (data structure containing type hierarchy elements, [0011]) corresponding to the input object type (query type).

While Li teaches does not explicitly teach (m) means for associating the object sub-typing data structure to the input object, it would have been an obvious choice because when a matched/highest type is determined and returned to the type query (410, 435), the source object (classX) and queried type (classy) are related/associated by the determined class relationship.

As to claim 1, it is basically a method claim of claim 21, and thus note claim 21 for discussion. It is noted that the two alternatives linked by "or" is interpreted as requiring only one. Nevertheless, Li further teaches requested supertype (query type for checking ClassY, [0026]).

As to claim 2, Li does not check the size of the embedded array ([0010]).

As to claim 3, Li teaches searching begins from a location(s) indicated by the requested supertype (reference to hierarchy tree, [0017], [0018]).

As to claim 23, note discussion of claim 21 for input object, embedded array and cache. The embedded array and cache in Li contain respective portions/groups of sub-typing data structure. Li further teaches an object locator unit (system of Li, including logic of [0026]) arranged to search the embedded array and cache for the requested supertype ([0017]-[0022]), the object locator unit further having connections to modify the contents of the cache (include a subset or all of the hierarchy, [0018]).

As to claim 25, Li teaches program execution unit (virtual machine) coupled to the object locator unit, wherein the connection is configured to enable the program execution unit to request object types and receive object-handling information from the object locator unit ([0002]).

As to claim 26, Li teaches the embedded array is contained within an object type data structure (320) associated with a computer program being executed by the program execution unit.

As to claim 27, Li teaches the first group of object sub-typing data structures and the second group of object sub-typing data structures are mutually exclusive in that object data is not replicated in Li ([0010], [0018]).

As to claim 28, Li teaches the second group of object sub-typing data structures is selected from a third group of object sub-typing data structures (subset or all of the entire type hierarchy, [0018]).

As to claim 29, Li teaches the cache is initialized to contain only object sub-typing data structures of a special type (cache contains subset of type hierarchy; Type includes array/interface types, [0018], [0024]).

As to claim 30, Li teaches the second group of object sub-typing data structures in the cache are the object sub-typing data structures substantially expected to be searched for by the object locator unit (common cases, [0026], listing; [0020]).

As to claim 31, Li teaches the first group of object sub-typing data structures in the embedded array has a hierarchical data structure (type hierarchy, fig. 3), wherein the hierarchical data structure has a fixed depth (depth, [0026], [0020]).

As to claim 33, it is basically a program product claim of claim 33 and thus note claim 21 for discussion. Li further teaches determining the object type of an input object ([0026], listing); retrieving and making available information associated with the found object sub-typing data structure (return, [0026], listing). Using a computer-readable medium to store the computer logic would have been obvious for the purpose of distribution.

As to claim 36, carrier wave, a CD-ROM, a hard disk, a floppy disk, a tape drive, and semiconductor memory are well known storage means, and thus it would have been obvious to use.

9. Claims 4-7, 10-14, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li as applied to claim 1 in view of admitted prior art APA ([0002]-[0006]).

As to claims 4, 5, APA teaches at compile-time (compiler), loading a location description (pointer) of a known-constant supertype (certain object types); incorporating the result of the location description loading into instructions (supertype requests) produced by a compiler and applying the location description (load pointer) at compile time to a known-constant input object type ([0005], [0006]). Therefore, it would have been obvious to include loading a location description, incorporating and applying into Li. One of ordinary skill in the art would have been motivated to combine the teachings of Li and APA because compile time generation of the data structure of Li is necessary for the operation of the data structure of Li.

As to claims 6, 7, Li teaches location descriptions corresponding to an embedded array location / corresponding to cache location (entries superclass [1], superclass [2], superclass [3] in data structure 320).

As to claims 10-14, Li teaches if the requested supertype is a special type (array/interface type), searching only the cache for the object sub-typing data structure corresponding to the input object type ([0018]); if the requested supertype is not a special object type (superclasses B, C, D), searching only the embedded array for the object sub-typing data structure corresponding to the input object type ([0010]); if the input object type is the special object type (interface type), comparing input object type directly against the requested supertype, and returning a match if the comparison is successful ([0026], code listing); and if the input object type is the special object type, omitting the object sub-typing data structure(s) corresponding to the input object type from an overflow array associated with the input object type ([0010], [0018]). As to sharing an overflow array between at least two object types when the object type search requires the same overflow array contents, this would have been an obvious choice in that sharing a parent class data structure by two or more child classes is conventional.

As to claim 18, Li teaches if the object sub-type is found, associating the object sub-typing data structure to the input object (a matched/highest type is determined and returned to the type query (410, 435), the source object (classX) and queried type



Art Unit: 2194

(classy) are related/associated by the determined class relationship). See discussion of claim 21.

10. Claims 8, 24, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of APA as applied to claim 5, 23, 33 and further in view of Hapner et al (U S Pat. 5,692,183).

As to claim 8, Hapner teaches a data structure (150) containing location descriptions (pointer 154) corresponding to an overflow array location (persistent data which is the complete collection of object data). Therefore, it would have been obvious to include location descriptions corresponding to an overflow array location into Li. One of ordinary skill in the art would have been motivated to combine the teachings of Li as modified with Hapner because this would have provided transparent support for data persistence (col. 4, lines 28-51).

As to claim 24, Li as modified by Hapner teaches an overflow array containing a third group of object data structures (persistent database 164), wherein the overflow array is arranged to be searched by an object locator unit (server) (col. 11, line 42 - col. 12, line 24). When the teachings of Li and Hapner are combine, it would have been obvious that the object data structure includes object sub-typing data structure.

As to claim 34, Li as modified by Hapner teaches searching an overflow array (persistent database 164) if object data corresponding to the input object type is not found in the embedded array and cache (transient memory). Col. 9, line 48 – col. 10, line 23. ). When the teachings of Li and Hapner are combine, it would have been obvious that the object data includes object sub-typing data structure.

11. Claims 9, 15-20, 22, 32, 35 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first / second paragraphs, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2194

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sue Lao whose telephone number is (571) 272-3764. A voice mail service is also available at this number. The examiner's supervisor, SPE Meng-Ai An, can be reached on (571) 272 3756. The examiner can normally be reached on Monday - Friday, from 9AM to 5PM. The fax phone number for the organization where this application or proceeding is assigned is (703) 872 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 18, 2005

  
**SUE LAO**  
**PRIMARY EXAMINER**